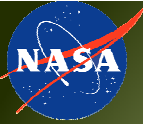


GIS IN SUPPORT OF FACILITY MASTER PLANNING

ADAM DUNLAP

**2009 NASA FACILITIES ENGINEERING AND REAL
PROPERTY SYMPOSIUM**



GEOGRAPHICAL INFORMATION SYSTEM IN SUPPORT OF MASTER PLANNING

Facility Master Planning Attempts to Accommodate the Future Needs of Humanity

1) User feedback

Percentages P_i	Lower bound	Coef A_i
several times / year	0.04	1
several times / month	0.11	12
several times / week	0.28	63
several times / day	0.17	365
Frequency (F)	77.06	0.385
	0.04	0.1 scale

2) Qualitative analysis of the feedback

	Severity < 0.2	Severity > 0.2
Frequency < 0.14	NO SIGNIFICANT RISK (no action required)	SIGNIFICANT RISK (immediate action required)
Frequency > 0.14	LOW RISK (high priority action required)	SAFETY CRITICAL

Hazard identification

AREA OF COMMON FIT
(Physical dimensions)

5th percentile of the Japanese woman population

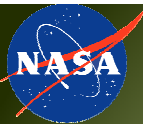
98th percentile of the American man population

3) Ergonomic analysis of the design of the permanent means of access

Dimension	Requirements
A	Height of the table top
B	Depth of the table top
C	Width of the table top
D	Height of the table top
E	Height of the table top
F	Height of the table top
G	Height of the table top
H	Height of the table top
I	Height of the table top
J	Height of the table top
K	Height of the table top
L	Height of the table top
M	Height of the table top
N	Height of the table top
O	Height of the table top
P	Height of the table top
Q	Height of the table top
R	Height of the table top
S	Height of the table top
T	Height of the table top
U	Height of the table top
V	Height of the table top
W	Height of the table top
X	Height of the table top
Y	Height of the table top
Z	Height of the table top

4) Guidelines development



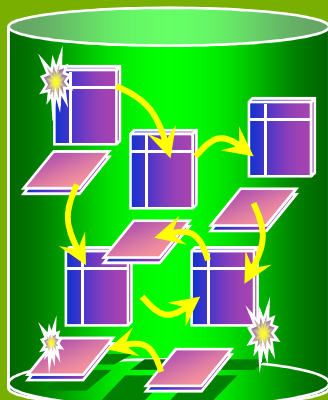


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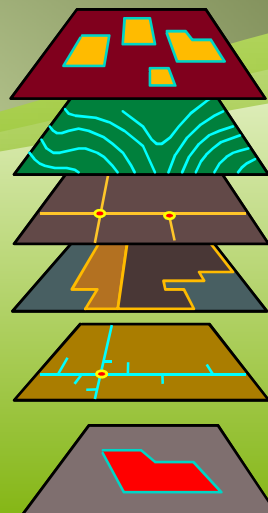
Imagery Sources

**Logical Based
Mathematical Analysis**

Many raster & vectors
layers of information in the
database representing
major themes for every
NASA center



GIS database



Buildings

Elevation

Roads

Wetlands

Utility Services

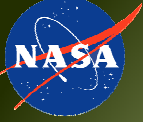
Zoning

Dynamic attribute data

Attributes of sde.SDE.Buildings						
BUILDING	X	Y	CORE_ASSET	NAME	TOT_USABLE	C
3305	-89.599401	30.375409	Y	Cent Comp Hqg Facility	9115	
4122	-89.587236	30.363954	Y	A complex A2 Test Stand	13936	
4210	-89.579757	30.363912	Y	BTest Complex Test Control Center	14366	
4110	-89.590731	30.363693	Y	A Test Complex Test Control Center	9040	
1110	-89.616192	30.367036	Y	Date/Eng Support Building	13054	
1105	-89.616346	30.360239	Y	SSC Environmental Lab	52904	
4010	-89.602227	30.360318	Y	Component Test Facility	24135	
8100	-89.622188	30.382861	Y	Comp Serv FacInst Lab	64285	
3202	-89.611293	30.354792	Y	Space Shuttle/S1C Booster	55027	
8306	-89.597005	30.377463	Y		7000	
4220	-89.579804	30.368876	Y	B complex B1 Test Stand	103145	
4221	-89.579804	30.368876	Y	B complex B2 Test Stand	103145	
4400	-89.583977	30.358633	Y	High Pressure Indus Water	2285	
4008	-89.602024	30.363973	Y	Test Facility E-2 Cell 2	0	
4120	-89.594147	30.364285	Y	A complex A1 Test Stand	14020	
1103	-89.616583	30.36994	Y	1103	42993	
6110	-89.622205	30.383936	Y	Cryogenics Building	19190	



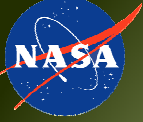
Better Decisions



GEOGRAPHICAL INFORMATION SYSTEM IN SUPPORT OF MASTER PLANNING

Why Use GIS for Master Planning?

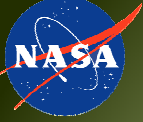
- 1. Site Selection and Suitability (Land Use)***
- 2. Neighborhood Analysis and Public Outreach***
- 3. Land Management & Environmental Stewardship***
- 4. Emergency Response Planning & Public Safety***
- 5. Facility and Asset Management***
- 6. Transportation Analysis***
- 7. LEED (Leadership in Energy and Environmental Design) Analysis
& Capital Improvement***
- 8. 3D Visualization and External Data Sources***
- 9. Alternatives and Choice!***



GEOGRAPHICAL INFORMATION SYSTEM IN SUPPORT OF MASTER PLANNING

What Types of Questions Can GIS Address for Master Planning?

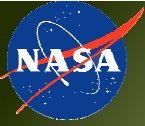
- 1. What is the population distribution at various times during the day?***
- 2. Would my new building's size impact available parking?***
- 3. What are the occupancy rates of the 4 buildings closest to the main thoroughfare?***
- 4. How many sustainable assets are currently being utilized and where are they located?***
- 5. Will the roads be compromised during a 100-year flood event?***
- 6. What is the energy cost per occupant per building per month?***
- 7. What are the impacts to noise/sound within an area?***



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A GIS-based Needs Assessment for Master Planning

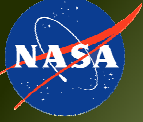
- 1. Identify Stakeholders***
- 2. Inventory Resources***
- 3. Establish Priorities***
- 4. Create System Design***
- 5. Conduct a Pilot Project***
- 6. Prepare Implementation Plan***
- 7. Implement the System***
- 8. Evaluate Successes and Failures***



GEOGRAPHICAL INFORMATION SYSTEM IN SUPPORT OF MASTER PLANNING

The Rosenbaum House (Florence, AL) by Frank Lloyd Wright

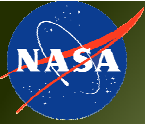




GEOGRAPHICAL INFORMATION SYSTEM IN SUPPORT OF MASTER PLANNING

The Rosenbaum House (Florence, AL) by Frank Lloyd Wright





**GEOGRAPHICAL
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PLANNING**

HANDOUTS